

Patent Claims

1. Adjustable steering column comprising
a steering spindle (1),
a shell unit (3) bearing the steering spindle (1),
a console unit (4) stationary on the chassis, with at least one side wall (5)
which extends laterally along the shell unit (3) and supports the shell unit (3),
a securement device which can be opened and closed, in the closed state of
which the shell unit (3) is unadjustably connected with the console unit (4)
through securing elements engaging one another, and in the opened state of
which the shell unit (3) is adjustable relative to the console unit (4) in at least
one adjustment direction and which encompasses a tension bolt (11)
penetrating openings in the shell unit (3) and in the at least one side wall (5),
for at least one adjustment direction a tilting part (26) acting in this adjustment
direction, which is supported either displaceably relative to the side wall (5) or
relative to the shell unit (3) in this adjustment direction, and which is
connected with the other of these two parts (5, 3) nondisplaceably in this
adjustment direction,
wherein with a torsion entailed in a deformation of the steering column, of at
least the segment of the shell unit (3) in the proximity of the side wall (5)
relative to the side wall (5) about an axis of rotation (60), parallel to the tension
bolt (11) and located in the proximity of the securement device, an entrainment
takes place of the tilting part (26) by that cited part (3, 5) with which it is
connected unadjustably in this adjustment direction, and clamping edges (36)
and clamping faces (35) of, on the one hand, the tilting part (26) and, on the
other hand, of that cited part (3, 5) relative to which the tilting part (26) is
supported adjustably in this adjustment direction, engage one another,
whereby the displaceability of the tilting part (26) in this adjustment direction
is inhibited.

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- 2. Adjustable steering column as claimed in claim 1, in which the tilting part (26) is a separate structural part connected with that cited part (3, 5) with which it is connected nondisplaceably in this adjustment direction, is connected via at least one engagement element (30) with at least two engagement points being provided spaced apart from one another.
- 3. Adjustable steering column as claimed in claim 1, in which the clamping edges (36) are provided on the tilting part (26) and the clamping faces (35) are provided on that cited part (3, 5), relative to which the tilting part (26) is supported displaceably in this adjustment direction.
- 4. Adjustable steering column as claimed in claim 1, in which the steering column is adjustable at least in its height and at least a tilting part (26) is provided acting in the direction of height adjustment.
- 5. Adjustable steering column as claimed in claim 1, in which the steering column is adjustable in the axial direction of the steering column as well as also in height.
- 6. Adjustable steering column as claimed in claim 5, in which the tilting part (26) relative to that cited part (3, 5) with which it is connected nondisplaceably in the adjustment direction, in which this tilting part (26) is effective, is supported displaceably in the other adjustment direction.
- 7. Adjustable steering column as claimed in claim 1, in which the tilting part (26) is connected with the shell unit (3) nondisplaceably in the direction of height adjustment and is supported displaceably relative to the side wall (5) in the direction of height adjustment.

- 8. Adjustable steering column as claimed in claim 1, in which the tilting part (26) has a central opening through which penetrates the tension bolt.
- 9. Adjustable steering column as claimed in claim 1, in which the tilting part (26) comprises, on the one hand, transmission ledges (43, 44) cooperating with the shell unit (3), which overlap edges, extending in the axial direction of the steering column, of the shell unit (3) and, on the other hand, comprises tilting ledges (28, 29), cooperating with the side wall (5), which ledges overlap edges, extending in the direction of height adjustment of the steering column, of the side wall (5) and/or engage grooves (45) extending in the direction of height adjustment.
- 10. Adjustable steering column as claimed in claim 1, in which the tilting part is disposed between the side wall (5) and the shell unit (3).
- 11. Adjustable steering column as claimed in claim 10, in which the tilting part (26) comprises transmission ledges (43, 44) cooperating with the shell unit (3), which overlap edges, extending in the axial direction of the steering column, of the shell unit (3).
- 12. Adjustable steering column as claimed in claim 10, in which the tilting part is guided in a depression (49) on the inside of the side wall (5), whose flanks, extending in the direction of height adjustment and delimiting the depression, form the clamping faces (35) cooperating with the clamping edges (36) of the tilting part (26).
- 13. Adjustable steering column as claimed in claim 1, in which the tilting part (26) is disposed on the outside of the side wall (5).

14. Adjustable steering column as claimed in claim 13, in which on the outside of the tilting part (26) a transmission part (37) is disposed with which the tilting part (26) is connected nondisplaceably in the adjustment direction, with the transmission part (37) being connected with the shell unit (3) nondisplaceably at least in the adjustment direction.
15. Adjustable steering column as claimed in claim 14, in which the transmission part (37) is connected with the shell unit (3) nondisplaceably in both adjustment directions.
16. Adjustable steering column as claimed in claim 14, in which for the nondisplaceable connection of the tilting part (26) with the transmission part (37) in that adjustment direction in which the tilting part is effective, transmission ledges (43, 44) are provided extending in the direction of the other adjustment direction.
17. Adjustable steering column as claimed in claim 14, in which the tilting part, seen in end-on view, has the form of a cross, wherein it comprises, on the one hand, arms (52) extending in the adjustment direction in which it is effective, on the other hand, arms (53) extending in the other adjustment direction.
18. Adjustable steering column as claimed in claim 17, in which the tilting part (26) with the arms (52) extending in the adjustment direction in which it is effective, is supported in a depression (51) on the outside of the side wall (5) displaceably in this adjustment direction, with the flanks delimiting this depression (51) forming the clamping faces (35) cooperating with clamping edges (36) of the arms (52).

19. Adjustable steering column as claimed in claim 18, in which at least one of the arms comprises a cutout extending from its free end, wherein extensions (57) are formed which, for forming a clamping edge in a torsion of the shell unit (3) relative to the side wall (5) are bendable in the direction toward the other extension.
20. Adjustable steering column as claimed in claim 19, in which the extensions (57) in the region to be bent off are provided with toothings forming clamping edges (36).
21. Adjustable steering column as claimed in claim 17, in which the tilting part (26) is supported with the arms (53) extending in the other adjustment direction in a depression (54) in the transmission part (37) displaceably in this other adjustment direction, and the side flanks of this depression form engagement elements for the nondisplaceable connection of the tilting part (26) with the transmission part (37) in the adjustment direction in which the tilting part (26) is effective.
22. Adjustable steering column as claimed in claim 13, in which the tilting part (26) comprises before and after the side wall (5) engagement elements (30) extending in the direction toward the shell unit, which overlap at least an edge extending in the direction of the longitudinal displacement, of the shell unit (3) and/or engage at least one guidance slot (31) extending in the direction of the length adjustment.
23. Adjustable steering column as claimed in claim 22, in which the engagement elements (30) are disposed on tilting ledges (28, 29), which overlap the front and rear edge of the side wall (5), wherein on these tilting ledges (28, 29) clamping edges (36) are provided, which cooperate with the front and rear edges, acting as clamping face (35), of side wall (5).

24. Adjustable steering column as claimed in claim 1, in which the console unit (4) comprises side walls (5) extending bilaterally along the shell unit (3), between which the shell unit (3) is guided.
25. Adjustable steering column as claimed in claim 24, in which the tension bolt (11) penetrates both side walls (5) through openings.
26. Adjustable steering column as claimed in claim 1, in which the securing elements of the securement device are at least partially formed by the friction faces of plates sandwich-like interdigitating one another, wherein plates (18) connected with the shell unit (3) as well as also plates (17) connected with the console unit (4) are provided.
27. Adjustable steering column as claimed in claim 1, in which for the mutual engagement of the securing elements a tensioning device, actuatable by a tension lever (21), for the tension bolt (11) is provided.
28. Adjustable steering column as claimed in claim 24, in which for both side walls (5) at least one tilting part (26) each is provided.